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circuits, and thus the bells at the respective stations are actuated by the batteries of the respective stations. If ten blows with a pause of a minute, and then ten more, is the signal that the engine is disabled ; ten blows, and a minute of contact, that an accident has happened ; a ringing continued beyond ten, that the permanent way is obstructed, the stations at either side are advised and can take the measures necessary to meet the case.

These contacts may be made by hooking a wire or rod on to the line wire and making the necessary contacts with the rail ; or, which is better, by establishing contact-makers, properly secured at frequent intervals on the telegraph posts.

This system gives to those in charge of disabled trains a certain means of asking for assistance from any point of the open railway, without any training beyond that of *counting ten* slowly and correctly. In practice, as between Red-Hill and Reigate, no inconvenience or loss of electricity has been suffered from counterbalancing the two currents.

The author states that there are other properties of opposed currents to be communicated on another occasion.

II. "On the Action of Aqueous Vapour in disturbing the Atmosphere." By THOMAS HOPKINS, Esq. Communicated by W. FAIRBAIRN, Esq., F.R.S. Received January 2, 1857.

(Abstract.)

In this paper it was maintained that the great disturber of the equilibrium of atmospheric pressure is the aqueous vapour which is diffused through the gases. These gases, when ascending, cool (say 5°) through expansion by diminution of incumbent pressure, whilst the vapour that is within them cools only 1° ; and a consequence is, that when a mixed mass ascends, the vapour is condensed by the cold of the gases. It is well known that condensation of vapour gives out much heat, and this heat warms and expands the gases when they are forced to ascend, taking vapour with them ; and the process being repeated and continued, an ascending current is produced in the atmosphere, cloud is formed, the barometer sinks, rain falls, and winds blow towards the part.

This was shown to take place in all latitudes, producing disturb-

ances great in proportion to the amount of vapour condensed. In tropical regions, where the aqueous material is abundant, the disturbances are great, but take place principally in the higher regions of the air. The diminution of atmospheric pressure within the tropics at the surface of the earth, as measured by the barometer, extends over a large surface, but is not great in any one place. In cooler latitudes condensation takes place nearer to the surface of the globe, and then reduction of pressure is confined to a smaller area; but in parts on the surface within that area the reduction is great, because the lower and therefore heavier gases have been warmed and expanded; hence the falls of the barometer in certain cool localities are the greatest. In very cold and dry regions, as a consequence of there being but little vapour in the air to be condensed, the barometer sinks only a little, and that sinking is generally confined to a small area. In accordance with this view, it was shown that, in certain places, where much continuous rain falls, the barometer has a low average; and towards these areas winds blow from distant parts, as in the great trade- and other winds. Sea-breezes were also shown to be consequences of the condensation of vapour, which had been produced by the morning sun ascending to sufficient elevations; whilst the land-winds at night are attributable to the cooling of those elevated parts by evaporation during the absence of the sun.

Various objections that had been made to this theory of atmospheric disturbances were noticed by the author of the paper, which, though admitted to be plausible, were stated to be invalid, whilst the most important meteorological phenomena were asserted to be in accordance with it.

III. "On the Structure and Development of the *Cysticercus Cellulosæ* as found in the Muscles of the Pig." By GEORGE RAINES, Esq., M.R.C.S.E. Communicated by R. D. THOMSON, M.D., F.R.S. Received January 16, 1857.

The observations detailed in this Communication were made known to the Society on a former occasion ('Proceedings,' Dec. 13, 1855), and are now reproduced with illustrative figures and suitable reference to contemporary researches on the origin and metamorphosis of the Cystic Entozoa.